Questioned Documents Unit (QDU)
Procedures for Processing Evidence Using Luminol
Section 8

1 Scope

This document applies to examiners and analysts in the QDU for the enhancement of patterned impressions in blood.

2 Equipment/Materials/Reagents

- Non-metallic spray bottle (200 ml - 8 oz) with a non-metallic spray apparatus
- Well ventilated darkened room
- Disposable gloves
- Lab coat
- Protective eyewear
- Dust/mist mask
- Luminol Kit - Bluestar Forensic
- Distilled water

3 Standards and Controls

3.1 Luminol Solution

In a non-metallic spray bottle (200 ml - 8 oz), add the contents of the Luminol Kit (two tablets) and 120 ml (4 oz) of distilled water. Stir gently to mix. Allow about 1 or 2 minutes for complete dissolution and mixing of the chemicals. Do not shake the bottle. The Luminol Solution will be tested in the dark on a positive control blood stain prior to use.

A positive reaction will produce a strong blue white luminescence.

Record the results of the control test in the *Chemical Enhancement and Control Logbook* located in the Shoeprint examination room.

The Luminol Kit can be stored unmixed for up to 3 years.

The Luminol Solution must be prepared fresh and used within 3 hours of mixing.

4 Sampling

Not Applicable.

5 Procedure

5.1 The item to be enhanced should be spread on a piece of brown paper on the floor of the designated room in the Photographic Operations & Imaging Services Unit (POISU). This room is a well ventilated room which can be darkened. The Luminol solution should be lightly sprayed as a fine mist on the item to be enhanced. When stains have been located they should be outlined with an appropriate marker and numbered for photography. The located stains should be photographed by POISU. Luminol spraying must continue during photography to maintain sufficient luminescence.

5.2 At the completion of chemical enhancement, refer to the *QDU Procedures for Conducting Footwear and Tire Tread Examinations*.

6 Calculations

Not Applicable.

7 Measurement Uncertainty

Not Applicable.

8 Limitations

Luminol reacts with the hemoglobin derivatives found in blood and produces light in a process known as chemiluminescence. In order to view an enhanced impression exhibiting chemiluminescence, the luminol enhancement process must be carried out in total darkness.

9 Safety

9.1 Adhere to the safety practices outlined in the *FBI Laboratory Safety Manual*.

9.2 Handle any specimens containing known or possible biohazards in accordance with FBI Laboratory health and safety practices.

9.3 Dispose of all chemicals according to the *Chemical Disposal Guidelines* on file in the Shoeprint examination room.

9.4 Safety information concerning each of the chemicals used in these procedures are available from the *Material Safety Data Sheets (MSDS)* on file in the Shoeprint examination room.

10 References

Kirk, Crime Investigations, New York, 1953.

Lytle, L.T. and Hedgecock, D.G., "Chemiluminescence in the Visualization of Forensic Bloodstains", Journal of Forensic Sciences, Vol. 23, No. 3, July 1978, pp. 550-562.

Gibson, E.P., "Review: Applications of Luminescence in Forensic Science", Journal of Forensic Sciences, Vol. 22, No. 4, Oct. 1977, pp. 680-696.

FBI Laboratory Safety Manual

QDU Quality Assurance Manual

QDU Standard Operating Procedures Manual

Rev. #	Issue Date	History
0	07/03/06	Rev. for ASCLD/LAB-International (ISO 17025).
1	03/01/18	1 Scope, added "This document applies to examiners and analysts in the QDU" Deleted 4 Calibrations. Refer to the *QD Quality Assurance Manual, Maintenance, Calibration and Performance for Equipment Verification"* and appropriately re-numbered.

Approval

Redacted - Signatures on File

Questioned Documents Unit Chief — Date: 02/28/2018

Footwear/Tire Tread Technical Leader — Date: 02/28/2018

QA Approval

Quality Manager — Date: 02/28/2018